350 Installations across..... 20 Countries
And expanding further.....

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ENVIROPOL
ENGINEERS PVT. LTD.

ENVIRONMENT
- Wet Scrubber
- Slurry De-Watering
- Electrostatic Precipitator
- Flue Gas Desulfurization
- Bag Filter (Online & Offline)
- Dust and Fume Extraction
- Dust Suppression

ENERGY
- Bagasse Dryer
- Enviro Earn-Hybrid Dryer
- Bio-Mass Dryers
- Co-Generation Power Projects

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**About Us**

ENVIROPOL has been a pioneer worldwide in supplying wet scrubbers to solve Air Pollution Control (APC) problems in sugar, power & other process industries. Today, it is ranked number one amongst few Indian companies for an active presence in the entire spectrum of APC business.

- Technocrats Promoted Group
- Founded in Year 2003
- Corporate Office Located in Noida, Built up Space: 6000 sqft.
- Total Employee Strength 100+
- Global Presence in 20 Countries
- More than 350 Installations Worldwide
- Manufacturing Facilities Spread Over 90000 sq ft

**Our Mission**

To deliver innovative, reliable and cost effective eco-friendly solutions to our customers for producing green energy and managing healthier environment for future generations.

*Pollutants are inevitable but pollution is not*

**Accreditation**

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**Wet Scrubbers**

**Our Manufacturing Range**

- Fluidized Bed Nye Tray
- Fixed Vane Scrubber
- High Energy Venturi
- Ventray Scrubber
- Multi Jet Spray Tower
- Packbed Tower
- Dynamic Scrubber
- Wet Cyclones

**Selection Criteria**

- Volume of Dust Laden Air/Gas
- Input/Output Dust Concentration
- Allowable Pressure Drop
- Particle Size Distribution
- Dust Characteristics

**Fluidized Bed Scrubber**

**Working Principle**

The contaminated gas is brought into intimate contact with a curtain of water layer directed at right angle to the gas flow through the multi orifice distribution plate (Bed Tray).

While passing through the orifice of tray, the whole volume of gas is divided into thousands of small streams, which are accelerated to impinge the water layer creating complete fluidization with allowable pressure drop of gas flow.

When the micron sized particulate matter pass through the fluidized bed of water, they are entrapped in the bubbles due to differential density and get precipitated in the scrubbing liquid.

Clean gas swirls upward to the outlet through double stage mist eliminator and centrifugal trap at the top. Liquid (with entrapped particles) drains via bottom cone for solid-liquid separation through mechanized slurry de-watering system.

**Advantages**

- Two Tier Separation - Dry and Wet
- Higher Scrubbing Efficiency (99 %+)
- Low Pressure Drop (60 mm w.c)
- Tolerates Very High Dust Loading (over 20 gm/Nm³)
- Trouble Free Operation - Absence of Scrubbing Nozzles
- Flexibility to Install Before or After ID Fan
- Inherent Quality to Reduce Gaseous Pollutant
- Low Water Requirement
- Easily Upgradable to Meet Future Norms
- Available with Integrated Stack Design
- Wide Range of Applications
**Fixed Vane Scrubber**

**Working Principle**

The dust laden flue gas enters the bottom of Fixed Vane Scrubber tangentially and flows upward forming vortex. This vortex / cyclonic action of the saturated gas stream, as it spins upwards, forces the heavier particles to fall out of suspension. Scrubbing liquid is introduced to the scrubber as a spray directed down over circular “Scrubbing Vane” arrangement. As the liquid drains through the vane, it creates curtain of Scrubbing liquid. The flue gas collides with the curtain and dust particles get trapped in the water curtain. The slurry thus produced is washed down to the outlet.

The cleaned flue gas is then allowed to pass through high efficiency mist eliminator vane (demister) for separation of entrained liquid droplets from flue gas. The change in momentum allows the finer liquid droplets to coagulate and form coarser droplets and gravitational and centrifugal forces are responsible for the separation of liquid droplets from the gas stream.

The filtered flue gas then allowed for discharge to atmosphere through stack.

**Advantages**

- Can Handle a Wide Range of Particle Sizes
- No Requirement of Nozzles
- Low Water Requirement
- No Moving Parts
- Simple Operation, Only Occasional Cleaning Required
- Can Accept Higher Dust Concentrations in Scrubbing Water
- Wide Range of Applications

**Venturi Scrubber**

**Working Principle**

The dust laden flue gas enters the converging section followed by venturi throat, where the velocity of the flue gas increases to its maximum. Scrubbing liquid is injected in the gas stream before or within throat. The scrubbing liquid is atomized by the turbulence in the throat improving gas-liquid contact.

The gas-liquid mixture then decelerates and it move through the diverging section causing additional particle-droplet impacts and agglomeration of the droplets. The liquid droplets are then separated from the gas stream in an entrainment section usually consisting of a cyclonic separator & mist eliminator.

**Advantages**

- Simple Construction
- Reduced Capital Cost
- Wide Range of Application
- Good for Collecting particles >10µm
- Simple Operation
- Lesser Threat of Chocking

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**Slurry De-watering Systems**

**Our Manufacturing Range**

- Mechanized
  - With Lamella Gravity Settler and Sludge Dredger
  - With Lamella Gravity Settler and Belt Press Filters

- Semi-Mechanized
  - With Lamella Gravity Settler and Vibro Screens
  - With Conventional Clarifier and Vibro Screens

- Conventional-Manual
  - With Under Flow Type Sludge Drying Beds
  - With Over Flow Type Ash Pond

**Selection Criteria**

- Lay out and Available Space
- Cost-Benefit Considerations
- System Capacity
- Quality of Re-circulation Water
- Availability of Manpower
- Dust Composition
- Ash Disposal Management

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**Mechanized Slurry De-watering system**

**Working Principle**

The slurry generated in scrubber is pumped to the Lamella Gravity Settler (LGS). Enviropol design of LGS is self-contained package settling unit with a conical sludge hopper.

The clarified liquid in LGS leaves the inclined plate assembly through orifices at the top and is distributed into collection channels leading to clarified water outlet for circulation back to the scrubber.

The thick slurry from the hopper flow to slow moving sludge dredger for separation and conveying of ash directly to trolley. Liquid thus separated from the dredger is pumped back to LGS. For drop free ash, HVAF is provided as an option.

**Advantages**

- Smaller Foot Prints
- Online Ash Disposal
- Sturdy Design
- Minimum Water Loss
- Manless Operation
Wet Electrostatic Precipitators

For Ultra Clean Gas

With increasing demand, world-wide, for reduction of respirable particulate and aerosols from various industrial processes, WESP technology from Enviropol - Envibat is gaining recognition due to its ability to capture sub-micron particulate with condensed acid mist unlike other dry separation techniques like Bag Filter & Dry ESP.

Our Manufacturing Range

- Square/Round/Honeycomb Construction
- Tower Construction with Integrated Stack

Working Principle

Gas Conditioning
The dust laden hot flue gases are first conditioned to near saturation to make it more conducive for charging through water spraying. For high dust loading, low pressure drop scrubbing is used for conditioning and reducing the dust load.

Charging
Saturated gas with fine particulate enters the charging section and given strong negative charge by ionizing corona produced by high voltage electrodes.

Collecting
The electrical field causes charged particles to migrate to the grounded walls of the tube where they accumulate.

Removing
The falling water film inside the tubes removes the collected material to a discharge drain.

Advantages

- Ability to Capture High Resistivity (>10^7 ohm-cm) Particulate
- Low Outlet Emission - Even Below 10mg/Nm³
- Substantial Reduction of Gaseous Pollutants H₂SO₄, mist & SO₂
- Ability to Capture Hg²⁺ and HCl
- Low Specific Collecting Area
- Ability to Handle Sticky Dust
- No Rapper Re-Entrainment
- No Fire Hazards
- Smaller Foot Prints

Upgrade your existing Wet Scrubbers to WESP

An opportunity exists, for the users of operating Bio mass Fired Boilers with Wet Scrubbers, to upgrade their existing system to WESP for more effective control of emission of fine particulate and acid mist.

Modular design and adaptability to fit into existing wet scrubber makes installation easy.

WESP has proved to be an effective and more economical solution for air pollution control for the boilers being converted for multi fuel firing application.

Flue Gas Desulfurization (FGD)

Our Manufacturing Range

- Wet FGD (Lime/Caustic/Sea Water)
- Semi-Dry FGD
- Dry FGD

Selection Criteria

- Sorbent Availability
- Effluent Disposal / Byproduct Recovery
- Layout and Available Space
- Location of Proposed Plant
- Operating & Maintenance Cost

Working Principle

WET FGD (DUAL ALKALI)

The flue gas is passed through specially designed Enviropol-Ventray FGD Scrubber to suit dual alkali (Caustic/Lime) application for over 95% SO₂ removal at optimized operating cost.

This Scrubber is designed to de-sulfurize the flue gas in two stages with lime & Caustic solution as solvents. The primary stage includes a Venturi section operating with lime followed by the final scrubbing with caustic solution using multi stage tray/spray tower.

The clean and de-sulphurised gas is then reheated using steam heater, mounted on top of the tray tower as an optional device before exit to the atmosphere through integrated stack.

The effluent generated is processed for de-watering for sludge disposal or for byproduct recovery in the form of salable Gypsum/Sodium Sulphate.

Advantages

- High SO₂ Removal Efficiency (over 95%)
- Available with Re-Heater & Integrated Stack
- Low Power Consumption
- Up-Gradable to Meet Future Norms
- Byproduct Recovery
- Free from Scaling & Plugging
- Optimum Cost of Operation
- Low Blow Down Rate & Water Usage

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Bagasse Dryer

Flash Dryer for Bagasse
For Energy Efficient Prolonged Co-generation

Bagasse and its conservation has become a necessity for upcoming sugar factories moving towards cogeneration. Enviropol Flash Dryers for Bagasse maximizes the generation of heat energy from the available system through substantial reduction in moisture content.

Working Principle
The hot and de-dusted flue gas from the boiler are made to pass through the flash tower under induced/forced draft. The wet mill bagasse is fed through a rotary-air lock feeder at the bottom of the tower. It is then carried upward in a co-current mode with the hot flue gas at a calculated velocity based on Average Particle Retention Time (APRT). During the process, bagasse moisture evaporates and the dried bagasse is subsequently separated through a high efficiency cyclonic separator.

The dried bagasse is continuously evacuated from the bottom of the cyclone(s) through air-lock valves for onward feeding to the boiler. The flue gas is released to the chimney through a booster ID fan. Adequate automation is provided for proper interlocking and protections.

Flash Dryer - Hybrid Model

With the emission norms getting more stringent, the capital expenditure on Air Pollution Control (APC) is increasing. ENVIROPOL - Hybrid Model of Bagasse Dryer provides an opportunity to the Millers to dry bagasse and clean the flue gas simultaneously to meet the present/future emission norms.
Dry Electrostatic Precipitator

- **Our Manufacturing Range**
  - VEP - Vertical Electrostatic Precipitator - 15000 m³/h
  - Conventional Dry Electrostatic Precipitator - Up to 350,000 m³/h

- **Selection Criteria**
  - Flue Gas Volume
  - Space Availability

**VEP-Vertical ESP**
The VEP is a dry electrostatic precipitator. The gas direction in VEP is vertical up through the collecting zone. It is designed in modular shape with each module capacity ranging from 1000 to 15000 m³/h.

- **Advantages**
  - High Efficiency on Sub-Micron Particulate
  - Low Cost Equipment
  - Robust, Heavy Duty Design
  - Integrated Dynamic Pre Collector
  - Small Foot Print
  - No Slip Stream
  - Few Moving Parts
  - Pre-Manufactured

Conventional Dry ESP

**Charging**
Hot gas with fine particulate enters the charging section and given strong negative charge by ionizing corona produced by high-voltage electrodes.

**Collecting**
The electrical field causes charged particles to migrate to the grounded walls of the collecting plate where they accumulate.

**Removing**
The accumulated dust on collecting plate are removed through heavy duty rapping arrangement.

- **Advantages**
  - Low Pressure Drop
  - High Efficiency within Permissible Dust Resistivity
  - Dry Collection - No Water Requirement
  - Wide Range of Application for Product Recovery
  - Integrated/Pre-Dust Collector (Optional)

Bag Filters

**For Efficient Dry Separation**

- **Our Manufacturing Range**
  - Single Module
  - Multiple Module
  - Circular Module
  - Bag Filter for Spent Wash Application

- **Selection Criteria**
  - Volume of Dust Laden Gas/Air
  - Layout and Space Availability
  - Desired Collection Efficiency
  - Dust Composition

- **Working Principle**
Dust laden air enters the dust collector through the hopper or casing depending upon application. An internal baffle distributes the dirty air within the housing, dust laden air slows down as it enters the collector, coarser dust particles drop into the hopper. The dirty air passes through the bags, dust is captured and collected on the bag exterior. Filtered clean air flows to the clean air chamber and exhausting through outlet. Periodic compressed air pulsing removes accumulated dust from the bags with cleaning frequency and duration adjusted by solid-state timers or PLC. Dust falls into the hopper for collection through the discharge device.

- **Advantages**
  - Trouble Free Operation
  - High Collection Efficiency
  - Can Capture Ultra Fine Particulates
  - Mechanized Down Stream
  - Low Compressed Air Requirement

**SPECIAL PURPOSE BAG FILTER - FOR SPENT WASH FIRED BOILER**

- **Variants**
  - Online / Offline Cleaning
  - Walk-in Personnel / Pent House
  - Hopper Entry / Cleaning Entry

- **Special Features**
  - Very Low Air To Cloth Ratio
  - ECO-Friendly Filter Bags
  - SS 316L Cages
  - Hopper Vibrator - Smooth Operation
  - Inbuilt Lime Dosing System
  - Added Hot Air Re-circulation System
  - Complete Instrumentations

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Dust / Fume Extraction System

Our Manufacturing Range
- Dry Type Dust/Fume Extraction System - Bag Filter, MDC, ESP
- Wet Type Dust/Fume Extraction System - Wet Scrubber, WESP

Selection Criteria
- Volume of Dust Laden Air
- Temperature of Dust Laden Air
- Inlet & Outlet Dust Concentration
- Dust Characteristics
- Particle Size Distribution

Working Principle
A dust / fume extraction system is an air quality improvement system used in industrial and commercial production shops to improve breathable air quality and safety by removing particulate matter from the air and environment. Dust extraction systems work on the basic formula of capture, convey and collect.

Capture
This is accomplished with well designed capturing suction hood (Conventional or Swivelling) to catch dust from its source of origin. Many times, the machine producing the dust will have a port to which a duct can be directly attached.

Conveying
This is done via a properly designed ducting system and manifolds to maintain a consistent minimum air velocity required to keep the dust in suspension for conveying to the collection device.

Collection
This is done via a variety of means, depending on the application and the dust being handled. It can be as simple as a basic pass-through filter, a cyclonic separator or an impingement baffle. It can also be as complex as an electrostatic precipitator, a multistage bag house or a chemically treated / water based wet scrubber.

Advantages
- Reducing Risk of Dust Explosion or Fire
- Increasing Visibility at Workplace
- Preventing Unpleasant Odors
- Reducing Cleanup and Maintenance Costs
- Increasing Worker Morale and Productivity
- Assuring Compliance with Health Regulations

Dust Suppression System

Our Manufacturing Range
- Dry Fog (Compressed Air Assisted) Dust Suppression
- Cold Fog (High Pressure) Dust Suppression
- Plain Water (Low Pressure) Dust Suppression
- Sprinkler Water Dust Suppression

Selection Criteria
- Material Characteristics
- Permissible Moisture Limit
- Application Point
- Feasibility of Dust Source Enclosure

Working Principle
Dry Fog System works on the agglomeration principle, fugitive dust particles collide with fine water droplets, generated by air assisted atomizers, get heavier and settle down on material stream.

Cold Fog System works on same principle as Dry Fog, fine water droplets generates through high water pressure nozzles.

Plain Water System adds some moisture into material stream to reduce it's dust generation tendency at following material transfer point.

Sprinkler Water System wets upper layer of stacked material to eliminate wind erosion risk.

Advantages
- Dry Fog System is capable to control fugitive dust emission with allowable moisture addition in material stream, less risk of air atomizer clogging & no wetting of conveyor belts.
- Cold Fog System is capable to control fugitive emission adding some moisture in material stream to reduce dust generation tendency at transfer points.
- Plain Water System is a low cost solution, easy maintenance & less risk of nozzle clogging.
- Sprinkler Water System is an appropriate solution for stacked bulk material, low water consumption is possible adding some dusting agent in water, easy maintenance & robust design.
### A Comparison at Glance

<table>
<thead>
<tr>
<th>Features</th>
<th>Scrubber</th>
<th>Bag house</th>
<th>Dry ESP</th>
<th>WESP</th>
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<tbody>
<tr>
<td>Extremely Fine Particles</td>
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<td>Aerosol</td>
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<td>Heavy Metals</td>
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<td>Dioxins and Furans</td>
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<td>Eliminates Opacity</td>
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<td>Low Gas Temp/High Dewpoint</td>
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<td>Sticky Particulate</td>
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<td>High Efficiency</td>
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<td>Gas Absorption Required</td>
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<tr>
<td>Low Maintenance Costs</td>
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### Industries Served
- SUGAR
- POWER & STEEL
- OIL & GAS
- AUTOMOBILES
- PAPER
- PALM OIL
- DISTILLERY
- CHEMICAL
- TEXTILE
- FERTILIZER
- CEMENT
- OTHERS PROCESS INDUSTRIES........

### Few of our Clients

- Dangote
- TEC
- Gulf Emco
- Indiabulls
- CPG
- Kordal
- Milan Energy
- Reliance
- Keral
- Uttam
- Takuma
- Yamani
- High Speed
- Ispat
- Moti Steel
- Inflex

### Industries & Applications

#### Environment
- Wet Scrubber
- Electrostatic Precipitator (Dry & Wet)
- Flue Gas De-Sulphurization
- Bag Filters (Online & Offline)
- Dust and Fume Extraction
- Dust Suppression
- Mechanical Dust Collectors

#### Energy
- Bagasse Dryer
- Flash Dryer - Hybrid Model
- Bio-Mass Dryers
- Co-generation Power Projects

#### Material Handling
- Slurry De-Watering System
- Fuel/Ash Handling System
- Pneumatic Conveying System

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